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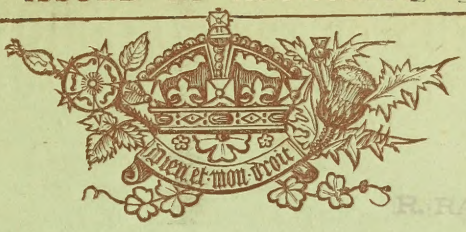

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A

NATIONAL FISHERY SOCIETY

BY

CHARLES E. FRYER

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International Fisheries Exhibition

LONDON, 1883

R. RATHBUN

A

NATIONAL FISHERIES SOCIETY

BY

CHARLES E. FRYER

AUTHOR OF THE EXHIBITION HANDBOOK ON "THE SALMON FISHERIES."

READ AT A CONFERENCE OF THE INTERNATIONAL FISHERIES EXHIBITION, JULY 26TH, 1883.

EDWARD BIRKBECK, ESQ., M.P., IN THE CHAIR.

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1883

CONTENTS.

	PAGE
PAPER ON A "NATIONAL FISHERIES SOCIETY." .	3
DISCUSSION ON THE PAPER	27
ADDENDUM TO THE PAPER	45

Conference on July 27th, 1883.

E. Birkbeck, Esq., M.P., in the chair.

A NATIONAL FISHERIES SOCIETY.

Mr. Fryer spoke as follows:

When I was invited, before these Conferences began, to read a Paper on some question connected with the Fishing Industry, and suggested, as a subject, the proposal, which I have the honour to bring under your notice to-day, for the formation of a National Society which should take up and carry on permanently, and on an extended basis, the good work which this Exhibition is, for the time being, doing in promoting a practical knowledge of the Fisheries, and in fostering enterprise in their development, I little thought that my suggestion would have received, by anticipation, such influential support as was accorded to it in the Inaugural Address delivered by the distinguished gentleman under whom I have the honour to serve, and who then expressed the "confident belief... that in these Conferences we have the germ out of which, by due process of evolution, a society especially devoted to the promotion of the interests of the fisheries of these islands may spring."

Unless, by some process of "thought-reading" peculiar to himself, Professor Huxley was able to ascertain what was then going on in my mind, he could not have had the

smallest notion of my intention to deal with this subject: and, although he may be said to have "taken the wind out of my sails" when he uttered the words I have just quoted, I have the gratification of feeling that, whether we take different courses, or sail all the time in company, we are both bound for the same port, and that my little barque is sailing under the same flag as his good ship. I trust that before I sit down I may have been enabled to induce many other vessels to join the squadron.

Before discussing how a "National Fisheries Society" can be formed, we must consider what such a body would have to do.

The interests involved in that word "Fisheries" are very many and very vast. First, we have the fish, properly so-called, and other marine animals, the capture of which is included in the term "fisheries": their varieties: their food: their habits: their habitat: their friends: their enemies. Next, we have man in his relation to the destruction of fish: his various appliances for their capture: their transport: their sale: and their preparation for food and other purposes. This branch of the subject directly affects the important industries of boat-building and fitting; net-making; hook-making; and the questions of market accommodation and communication between producer and consumer. Then there come the questions of the protection of fish, and the desirability or otherwise of taking direct measures for their multiplication; of the maintenance of order among those engaged in the industry; and of their welfare—moral and physical—both at sea and ashore. Last, but not least, have to be considered the large array of industries and interests indirectly affecting, or affected by, the fisheries, such as the manufacturing, milling, mining, agricultural, and navigation interests; the question of drainage as touching

the inland waters and the waters immediately contiguous to our coasts ; and then, on the wide sea, the great shipping interest, with its questions of lighthouses, harbour-accommodation, "rules of the road," and so forth.

Most of these individual points have already been dealt with in the various papers read before the Congress, and it is needless, therefore, even if it were possible, in a short Paper like this, to do more than touch the fringe of this far-reaching subject, in which each detail,—like the thousand threads in the weaver's loom, where a vast fabric of various colours and intricate pattern is being woven,—has its allotted part to play. A few illustrations will serve to show the opening there is for a duly qualified central body to gather up the various threads, many of which lie ravelled and in a confused heap, and to work them, each in its due order, into a complete and harmonious whole.

First, then, as to the natural history of fish. It is obvious that, before the fisherman can set to work satisfactorily to catch the fish, he must know when and where they are to be found. Before he can arrange to follow them, he must find out whether they are migratory or sedentary in their habits ; and he will find it necessary to discover the causes which lead to their migration ; whether, for instance, the state of the weather has any influence upon them ; or, whether their movements are affected by the presence or absence of food, or of enemies. Before he can arrange the length and depth of his lines and nets, he must be assured whether the fish swim near the bottom, or close to the surface, or midway between the two. Before he can select his bait, he will want to know what is the favourite food of the particular fish he is intent on hooking. But, though the fishermen number among them many acute observers who are able, after long experience, to judge of the prospects of

their night's work from signs which would escape the ordinary looker-on, many of these points are beyond their power to elucidate. A skilled fisherman will tell by the colour of the water, by the flight of a flock of sea-gulls, or by the movements of a school of porpoises, whether a shoal of herrings, pilchards or mackerel is within "measurable distance" of being caught. He will know too well, when the waves are crested with that beautiful phosphorescent light which visitors to the seaside like to watch on a dark night, that his chances of a good catch are very small, since the fish will see his nets as they hang, like a sheet of liquid fire, near the surface. But he cannot tell what part the minute organisms, which give rise to these phenomena, may be playing in the economy of the fish; he cannot always tell you where or when the different kinds of fish spawn; he can only guess where the migratory fish go after their periodical visits to the shore; and he is utterly at a loss to explain the reasons of their occasional total disappearance for several years at a time from a coast which they have visited regularly, year after year, as long as he can recollect. Round our own coasts, off those of Norway, Holland, or France, in the United States, wherever you go, you will find records of the occasional utter annihilation of a fishery which for years had been an annual source of enormous wealth. Many thriving cities, revelling in the wealth of an abundant herring fishery, for instance, have been suddenly ruined because the fish have, for some inscrutable reason, forsaken their accustomed haunts. The history of the ancient cities of Marstrand and Uddevalla in Norway, and in more recent times of Bergen and Trondhjem, and, in our own country, of Ullapool, Fort William, and other places, the fortunes of all of which, made by the abundance of the herring, have been often

marred by their sudden disappearance, is well worth studying in connection with this subject.

It is difficult, but who shall say that it is impossible, to discover, first, the causes of these fluctuations and occasional failures of a fishery; and, second, the localities to which the fish migrate during their disappearance. The list of causes that have been suggested for the occasional local failure of herring fishery, is a formidable one, ranging from "overfishing" to the "burning of sea-weed," from the "building of lighthouses" to the "employment of steamers," and from "making noises on shore" to the "wickedness of the people." Curiously enough, this last reason is very commonly alleged, not only in England and Scotland, but in Holland, and in Sweden and Norway. In the latter country, indeed, the people, some 300 years ago, reproached themselves—or each other, more strictly speaking, perhaps—so bitterly for having been, by their sins, the cause of the disappearance of the herring, that a law was passed for the express purpose of improving the morals of the people, and so inducing the fish to come back. I need hardly say that this law—whatever its effect on the people—had no more effect on the fish than a proclamation calling on them to return at the peril of their lives would have done; or an advertisement in the *Times*, setting forth the fact of their "mysterious disappearance," and asking them to return to their anxious friends, when "all would be forgiven." But the herrings did return—when it pleased them—some years afterwards, only to go away and return again at intervals of a few years.

These intermittent periods of plenty and scarcity—notably in the case of the Great Bohüslan fishery—have continued ever since, and probably will continue until the end of time; but, if we cannot prevent the occasional

disappearance of any particular kind of fish, we may possibly be able to prevent the ruin which its disappearance entails on large communities of industrious and hardy fishermen and their families; we may possibly find out where the fish go, and so enable the fishermen to follow them; or we may at least prepare the fishermen for the impending failure of one branch of their industry and enable them to take measures for the more efficient prosecution of another. At any rate, if we can prove that it is Nature and not Man that is at the bottom of the matter, we shall not have demands for hasty legislation restricting the fishermen in the pursuit of a calling which requires development rather than curtailment. On the other hand, if it is found that man's interference has had a prejudicial effect on the fisheries, and that Man and not Nature is the cause of their deterioration, we shall be able to enact wise laws for their protection, instead of taking a "leap in the dark," which may be productive of disaster rather than of benefit.

Though artificial causes undoubtedly do exert a very powerful and often very destructive influence upon certain fisheries, such as those of our rivers and lakes, and others confined within comparatively narrow limits close to the shore, it is evident that the farther you get out into the deep sea the more infinitesimal are the effects of your mightiest efforts. In the case of fish of such prodigious powers of reproduction as the herring, the cod, the haddock, the mackerel, the whiting, the hake, and others, of which, for every one that all the fishermen in the world catch, tens and hundreds are destroyed by their natural enemies and by each other—the fathers and mothers often preying upon their own children—it is not difficult to see that not only is the cry of "over-fishing" a false alarm, but our appliances

for the capture of these fish might be made very much more efficient with very great advantage.

Such an improvement in the methods of capture might very easily be expected as our acquaintance with the habits of fish increased; and it is consequently essential to the future development of the fisheries that, from this point of view alone, a systematic study of these questions should be conducted under the control of a central institution where results would be recorded and whence practical information would be disseminated among those who would be benefited thereby.

It not infrequently happens that, while the fishermen in one country are groping in the dark towards the discovery of an improved mode of fishing, a new form of net, a fresh kind of bait, or a handier rig for their boats, their fellow craftsmen in other countries have anticipated them, and improvements have become established facts in one country which in another exist only as vague ideas. An illustration of this has come under my notice in the present Exhibition. In the collection of nets from Cornwall is shown a model of an improvement in seine nets, suggested by Mr. Matthias Dunn of Mevagissey. A seine net is a net which is shot in a circle round a shoal of fish, so as to completely surround them, the head-rope of the net being buoyed by corks and kept floating on the surface, while the foot-rope is leaded so as to touch the ground. A large shoal of pilchards or mackerel can be enclosed in this way beyond possibility of escape, and the fish are then taken out of the water in detachments by means of a smaller net, called a "tuck-net," which is shot inside the seine, until all the shoal has been caught. But, from the nature of the case, a seine can only be used in shallow water, and the fishermen have to wait until the fish are within such a distance of the

shore that the bottom of the seine may be certain of touching the bottom of the sea. Mr. Dunn conceived the idea of so arranging the seine that, when shot in deep water round a shoal of fish, the bottom edges of the net might be drawn together by ropes and the fish prevented from escaping by "sounding." When he came up to London he found a precisely similar idea carried out in what is called a "purse-seine," exhibited in the United States section of the Exhibition, and he then learnt that this net had been in successful operation in America for several years, and that shoals of fish, which would otherwise have escaped capture, had been caught far out at sea in deep water by its means. No doubt when Mr. Dunn conveys this piece of information to his fellow-countrymen in Cornwall he will find less difficulty in inducing them to adopt the system than he had when it was merely a "new-fangled idea" of his own. But if there had been some central authority—such as the Society whose formation I advocate—to whom Mr. Dunn could have applied for information as to whether his idea was entirely new, or had been adopted or found impracticable elsewhere, he might have been saved much trouble, and the fisheries whose interests he has so much at heart might have derived earlier benefit from the introduction of the net into general use.

A "National Fisheries Society" aiming at showing what might be done in our own country should in this way be in a position to give the fullest information as to what is being done in every other country. While professing to be National in its aim, it would be really International in its character. I am sure that such an institution would not fail to meet with every encouragement, not only from those connected officially and privately with the fishing industries of the wide possessions of the British Crown in every part

of the world, but from those Foreign States which have contributed so largely to the success of this Exhibition, where they have taught many of us so many things that we never knew before, and whose representatives have been so ready to furnish information to every one wishing to learn anything about their important and interesting fisheries. Speaking personally, I have never yet failed to receive the most courteous consideration at the hands of every one to whom I have applied, officially or privately, for information on any subject connected with fish and fishing in other countries; and I feel sure that I may promise, should the Society, the germ of which I venture to bring to your notice to-day, ever become the important body into which I should like to see it develop, that it will always be ready to reciprocate, to the best of its power, the good-will with which its friends in other countries would, I venture to anticipate, welcome its birth, and watch and assist its growth.

A more intimate acquaintance with the natural history of fish, and a thorough study of the extensive array of natural phenomena affecting the fisheries, are a necessary precedent, not only to the full development of the practical fisherman's art, but to the adoption of beneficial legislation. Laws based on incomplete information are pretty certain to be ineffectual and inconvenient, if not positively injurious to the fisheries and to those concerned in them. No one in his senses would propose to make the close time for salmon, for instance, begin at this period of the year. Yet this is precisely what was done by two very well-intentioned Acts of Parliament passed, the one in the reign of good Queen Anne, and the other in the reign of George I. The former of these laws forbade the taking of salmon in the Hampshire rivers from June 30 to

November 11, and the latter prohibited their capture in the Severn, Wye, and most of the English rivers north of the Dee and the Trent between July 31 and November 12. As the object of a close season is to spare the breeding fish, and as salmon do not certainly spawn in the rivers alluded to at this time of year (July), and as they certainly do spawn in the very period when their capture under these Acts was allowed, it is very evident that the enactments referred to were worse than useless; and it is not surprising, therefore, that in a later Act we find Parliament confessing that the "time limited for restraining the taking of fish is not properly suited or adapted to the fishing seasons so as to answer the intentions of" the legislature. Such a mistake as this could not have occurred if the salmon fisheries had been made the subject of systematic investigation prior to legislation.

Fortunately we do not live in quite so much darkness as existed at the time these Acts were passed; or, to take another instance, at the time when an Act of the reign of George II. based an enactment regulating the capture of lobsters on the notion that, as the preamble of the Act recites, "lobsters crawl close to the shore to leave their spawn in the chinks of the rocks, and as much under the influence of the sun as possible."

But we need not go back to the beginning of last century for examples of hasty legislation on imperfect information. In 1809 a law was passed limiting the size of mesh for herring-nets in Scotland to one inch. This law took no cognizance of the fact that the one-inch net would not catch the sprats, the fishery for which, in the Firth of Forth, was closely associated with that for herrings; and the industry of the sprat-fishers was consequently seriously interfered with. When, in 1851, all nets except drift-nets

with a one-inch mesh were prohibited for the capture of herrings, the sprat-fishermen, who used scringe-nets, were threatened with the extinction of their industry, and the herring-fishermen on the west coast of Scotland, who used seine-nets, were in a like plight. A few years later an Act was passed fixing a close time for herring on the west coast of Scotland—an enactment which experience has proved to have been perfectly unnecessary for the protection of the fish. The enforcement of these laws was the cause of grievous hardship among the fishermen, and serious disturbances occurred in consequence. But it was not till 1868, after three separate Commissions had inquired carefully into the matter, that these restrictions were condemned, and formally abrogated by Act of Parliament.

Another instance of the dependence of wise legislation upon accurate practical knowledge of the habits of fish may be found in the case of the outcry against trawling. The principal ground of the objections originally urged so loudly against the use of the beam-trawl—that net which, shaped like a long wide-mouthed purse, is dragged along the bottom of the sea, ensnaring the soles, plaice, turbot, and other bottom fish—was that it destroyed the spawn of different species of fish, particularly that of the herring, the cod, the haddock, the whiting, and so on. Now it so happens that the spawn of the herring is deposited at the bottom of the sea, resting there often in enormous masses, resembling very closely, in appearance and consistency, a tapioca pudding. The fishermen jumped to the conclusion that the spawn of every other fish was deposited in the same way, and, as sometimes a trawl would be found to contain small quantities of herring-spawn, the cry was at once raised that the trawlers were denuding the ocean of fish.

Those interested in the long-line fishery, with which the trawl competed most directly and most successfully, joined in the outcry, and the complaint was pressed most strongly upon the attention of the Royal Commission appointed to inquire into the Sea Fisheries of the United Kingdom in 1863. That Commission failed to be convinced by the arguments brought against the use of the trawl, and most wisely declined to interfere with it. Their action has since been most unexpectedly and most completely justified by a discovery made by Professor Särs, who, while investigating the condition of the cod-fisheries off the west coast of Norway, found that the eggs of the cod were not deposited at the bottom of the ocean, like those of the herring, but floated freely on the surface of the water, where it is obviously impossible for a net, dragging along the bottom of the sea, to affect them in the slightest degree. It has since been shown that the eggs of the haddock —which belongs to the same family as the cod—and of the mackerel—which belongs to an entirely different *genus*—also float on the surface, and the case against the trawl therefore, as destructive of the spawn of these three fish at least, has been completely disposed of. It has been disposed of in an equally satisfactory manner as regards the herring, by the enormous increase which has taken place in the yield of the herring fisheries, the number of barrels of herrings cured in Scotland alone having steadily increased from 130,000 barrels a year in the early years of the century, till it now exceeds 1,000,000 barrels a year.

But within the last few years, instead of having to rely on the wind for their means of propulsion, many trawling vessels have been fitted with steam-engines, rendering them independent of wind and tide, and increasing many times their fishing power. The employment of steam has revived

the outcry against trawlers generally, but the complaint against them is somewhat modified. In some quarters the old belief in their injury to the spawn still survives, with the usual tenacity of life with which all mistaken notions seem to be endowed; but the charge practically resolves itself into one of destroying, not the spawn or eggs, but the fry or young fish. No trawler will deny that his net does destroy a large quantity of immature fish; but that admission is by no means a conclusive proof of his guilt. The charge has no significance, unless it means that the destruction of young fish which he occasions has the effect of diminishing the supply of adult fish. It is as easy to deny as to make this charge; but it is a much more difficult matter to prove either side of the case. If the charge of causing the deterioration of the fisheries embraces the cod, ling and haddock, and other members of the cod family, it may be answered by referring to the vast development of these fisheries, as shown by statistics, in spite of—probably largely in consequence of—the use of the trawl. But if the allegation that the fisheries are decreasing be confined to the fish which are chiefly taken by the trawl, viz. the flat-fish, such as soles, turbot, flounder, plaice, brill, &c., it is less easily disproved, for the reason, first, that we have no such statistics of the quantities of these fish captured as we have in the case of cod and herring; and, second, that our knowledge of the habits of the *pleuronectidæ* or flat-fish is even more meagre than our acquaintance with the natural history of the *gadidæ* or cod. The probability is that the flat-fish are no less prolific than other species; we know, indeed, that one of them, the turbot, is one of the most prolific fish known; and it is equally probable that the destruction of small flat-fish by trawl-nets bears no greater relation to the depredations among them of

their natural enemies than the wholesale destruction of herrings by the herring fleets has been shown to bear to the havoc which other enemies besides man work among them, and that is that it is infinitesimal.

It is very doubtful whether the destruction of small fish by trawlers is at all comparable to the destruction of small fish by shrimpers, and, above all, by the whitebait fishermen. Now it is very certain that a shrimp dredge catches more shrimps than small fish. If it did not, I fancy we should hear a very loud outcry over the decay of the shrimp fishery. If the shrimp trawlers therefore, catching enormous quantities of one, or at the most, two kinds of crustacean, do not exhaust the supply of those two animals, can it be seriously argued that they will do much towards exterminating, not one, nor two, but a dozen different kinds of sea-fish, of which they capture a far smaller quantity, which are all of them far more prolific than the shrimp, and all of which make the shrimp their prey, while the shrimp can do little or nothing in retaliation? If, again, the trawlers are to be disestablished because they are annihilating our fisheries, surely the whitebait fishermen must be included under the same ban. Numbers of men fishing month after month, every year, not incidentally, but of malice aforethought, for the young of herrings, sprats, and other fish, in a single estuary, must surely do a great deal more damage than even a much larger number of men fishing in the deep sea and catching young fish only as an incident in their occupation. If the fish in the deep sea are decreasing because of the ravages of the latter class, surely the supply of whitebait in the estuary of the Thames must be decreasing through the destruction occasioned by the former. Yet as a matter of fact it is not diminishing; on the other hand, increasing quantities of whitebait are

eaten every year, not only in London but throughout the country. But it is as fallacious to argue that, because the herring fisheries are inexhaustible, therefore all fisheries are inexhaustible too, as to contend that, because the salmon fisheries are capable of being fished out, unless adequately protected, therefore all other fisheries require similar protective laws. The cases of the salmon and the herring have been proved to demonstration; but there are others that have not, and, as the opponents of trawling have reduced their case to a point on which we have no definite information, the question becomes one for investigation. They claim the prohibition of "inshore trawling," *i.e.* trawling in bays and within a certain distance of the shore, on the ground, first, that trawlers should be kept out of the way of the smaller boats engaged in other modes of fishing; and, second, that the bays are "the nurseries" for young fish. The former point will be referred to later on. As regards the latter, it may be pointed out that there is no proof that the inshore banks and bays are or are not the sole, or even the principal, ground on which the supply for maintaining the stock of fish in the sea is produced. We require to know more of the habits of the fish particularly affected, their times and places of spawning, their migrations, their food, and so forth, before we can arrive at anything like a definite conclusion on this subject. That the question is a many-sided one is evident. The complications of this, as of almost every other, fishery question, were illustrated a few days ago in a Paper read by Dr. Day on the Food of Fish, in which he pointed out that, if the mesh of the trawlers were so arranged as to allow all small soles to escape, the smallest sole of all, *solea minuta*—an insignificant and worthless creature never exceeding when full grown three or four inches in length—

would be left to increase and multiply unchecked, to consume the food on which the more valuable species live.

Just such another and even more striking instance is afforded by the history of the oyster fisheries. Those who advocate the total prohibition of dredging in close time, and of the carrying ashore of undersized oysters, forget that in the one case the star-fish and the dog-whelks would be left to settle on the oyster beds like vultures round their prey; and in the other (as Mr. Huxley has pointed out) the oysters with tender shells, which would most surely be attacked and could most easily be destroyed, would be left for the star-fish and dog-whelks to fatten upon, instead of being brought ashore and laid down on suitable beds, and fattened for the use of man.

On this question of star-fish and other enemies of fish, there is much room for the diffusion of useful knowledge among the fishermen. The trawl-net, for example, often brings up, besides its wicked load of small fish, large numbers of star-fish, "tingles," and other vermin which would escape if the mesh were enlarged. When out trawling I have often seen the fisherman, when casting overboard his rubbish, tear a star-fish in two and throw it away with a by no means complimentary valediction. What has such a man done? Instead of casting back one star-fish he has returned two to the water, for this creature has the power, if not of replacing its lost members, at least of living very comfortably *minus* one or two; and if the star-fish does not grow a new finger, the finger may be said to grow a new star-fish. A bucket of hot water would effectually close the career of such creatures, and fishermen should be instructed to absolutely destroy all kinds of vermin. In France, in the agricultural districts, may be seen hung on the walls of the public schools notices conveying

in a few words some bit of practical information, such as "Spare the ladybird; it is a friend to the farmer." In some such way might be distributed among the fishermen's rooms, and on board their boats, cards with, among other things, the warning, "Destroy the star-fish; it is an enemy of the fisherman." Instead of casting their vermin overboard the fishermen should bring them ashore, where they would make very good manure for their gardens. A fisherman, going to cultivate his potato patch on his return from fishing, would not leave a fine row of healthy thistles to grow and scatter their seed over his and his neighbour's gardens to the detriment of his crop; neither would he pick up a slug from one part of the garden to cast it on to another. As he would kill the slug, and uproot the weeds instead of merely cutting off one head to let another grow, so he should destroy the vermin he may find on his fishing-ground.

If all the fishermen agreed to bring ashore all the rubbish they collect at sea and the entrails of the fish they gut on board, they would enable local establishments to be started to utilise all this offal as manure, and thus convert what is at present not merely a waste, but a harmful, material into a source of wealth. In some cases, for example, dog-fish are occasionally met with in such enormous shoals, mixed up with other fish, as to make the fishing in the fishermen's estimation worthless. If they knew that in killing the dog-fish they were benefiting the fishery, even if they did not receive any very high price for them for the sake of their oil or for the preparation of manure, they would surely rather bring them home than leave them to go free like wolves among their flocks.

In directing attention to such matters as these—which must commend themselves with especial force to those who

advocate all sorts of protective legislation for the sea-fisheries —the proposed Society would find a large and useful sphere of operations. Such work would form a necessary part of its larger duty of examining into all questions affecting the productiveness of the fisheries and the direction man's operations should take in developing them.

Many of these questions are matters requiring years of incessant study. In the meantime, however, we may arrive at something like a practical solution of the problem in a shorter way by collecting accurate statistics of the quantities of each kind of fish caught every year, and of the number of men engaged in the various fisheries, together with the area of netting or the number of hooks employed by them.

The Legislature would then have something tangible upon which it could decide whether to accede to, or to resist, the demands of the fishermen for the suppression or regulation of this, that, or the other method of fishing. But it is not merely on the point—essential as its consideration is—whether the yield of any kind of fish is diminishing or not, and to what causes—natural or artificial—such diminution is attributable, that a National Fisheries Society could render a national service. The question of "police" is largely involved in the allegations which one class of fishermen urge against another. If the line-fishermen were not affected by the competition of the trawlers, or the seiners by that of the drifters, and so on, and if there were none of the unfortunate occasions for complaints of injury done by one kind of gear to another, which occur from time to time, I venture to think we should hear less of the harmfulness of the new modes of fishing. But it is essential that no lawful mode of fishing should be needlessly or wantonly interfered with by

another, and, just as the policeman who stops your cab at the street corner, to allow a cross current of traffic to pass, is justified in thus interfering with your freedom of movement, so the Government is justified in regulating the movements of fishing-boats at sea. Indeed it would fail in its duty if it did not do so. It follows that the more intimate acquaintance with all the intricacies and technicalities of the different modes of fishing, which would result from the labours of the proposed Society, would be of great service in enabling those regulations to be framed with due regard to the special requirements of every branch of an important industry.

As I have already pointed out, one of the greatest evils to which any industry can be subject is that of spasmodic legislation—legislation framed to meet a popular cry of the moment. Among a certain class of people whose view is bounded by the horizon of their own particular standpoint, a demand for legislation is heard on every imaginable pretext. Soles are scarce: then trawlers must be abolished. A "salmon disease" appears: therefore the salmon fisheries will be ruined unless power is given to "stamp out" the plague. Oysters are dear: hence dredging must be put a stop to. The pilchard fishery is a failure: so drift nets ought to be put down. Of the evil effects of legislating in a scare we have had recent experience in the case already referred to of the Scotch herring fisheries. By "keeping touch," to use a familiar phrase, of the whole question of the fisheries, not only in our own country but in every other part of the world, a National Society would be able to gauge the real value of popular cries like these, and, always feeling the pulse of the patient, could furnish the data upon which the doctor could judge whether a surgical operation, or a dose of medicine, or a mere relaxation from restraint, was necessary.

On the other hand, there may easily occur cases in which the interests of the fisheries are in danger of being overlooked from the want of some Argus-eyed body watching in every direction for anything that may, directly or indirectly, affect them for good or for evil. If a National Fisheries Society had existed in the middle of last century it is very improbable that the weirs, which then began to multiply in all directions, would have been allowed to establish themselves without some stand being made on behalf of the salmon fisheries. I have elsewhere endeavoured to show that, when the introduction of pound locks, a hundred years ago, transformed weirs from an obstacle to navigation into an aid to inland navigation, the resistance which had been offered to dams ever since the time of Magna Charta, partly for the sake of the fisheries, but more particularly on behalf of the freedom of river navigation, suddenly changed into a zealous advocacy of these structures, on account of the service they rendered, with the help of navigation locks, to the boating interest. The fisheries were forgotten, with the result that from this, among other causes, many rivers were entirely denuded of salmon, and the rest brought to the verge of exhaustion.

The same with pollutions. As mining and manufacturing enterprise grew in this country the interests of the fisheries were more and more neglected. Little by little the evil of pollutions increased. One small factory or mine, whose refuse was a mere bagatelle, formed the nucleus of a vast collection of industrial works, the united volume of whose filth was sufficient to poison a whole watershed. It would be not the least important object of a Society devoting itself to the interests of the fisheries to guard in the future against similar agencies inimical to the welfare of the fisheries, and to seek to devise remedies for those from

which they already suffer at the hands of other interests. The fishing industry is so closely identified, either to its detriment or to its advantage, with so many other interests—mining, manufacturing, agricultural, navigation, sanitary—that an almost illimitable field lies open for the watchful operations of a National Fisheries Society. I have not space to refer to the way in which the Society could aid the fisheries by directing meteorological research in organising a system of storm warnings; by pointing out improved means of communication between fishing-boats and the shore, and, by telegraph or otherwise, between localities where fish may happen to be, and the ports where the boats may happen to be lying. These and many other subjects will suggest themselves as fit points to engage the attention of such a body.

It may be said that, in many of the questions referred to, such a body would be usurping the functions of the Governments. I venture to think that the Government would be well advised if, imitating the example set by the Governments of Canada and the United States, it were to consolidate or affiliate the various departments charged with the administration of the fishery laws, enlarge their functions, and enable them to study and deal with the various questions connected with the fisheries in a comprehensive manner. If it did no more than provide machinery for the collection of accurate and detailed statistics it would be taking a comparatively small but most important step. At the present moment the only fisheries of which we have anything like really useful statistics are the Scotch herring fisheries; less complete returns are furnished of the cod and ling fisheries of Scotland; and approximate returns, of a very imperfect character, are supplied in regard to the English and the Irish salmon

fisheries. Beyond this all is mere conjecture. In the traffic returns of the railways, in the dealings of our large London and provincial markets, lies the only possibility of a private body collecting statistics relating to the fisheries. But the Government might easily employ the coastguard and the custom-house officers to gather detailed information of the utmost importance, and the system of registering fishing vessels might probably with little difficulty be extended to the tabulation of returns relating to their catch, and details respecting their outfit, &c.

But, whatever the Government might do, such a Society as I propose should take some such position in relation to fisheries as the Royal Agricultural Society holds in regard to agriculture, the Royal Botanic and Horticultural Societies in relation to horticulture, or the Royal College of Surgeons in relation to medicine. Nay, more. I venture to think that it would have a claim to State recognition, and that a really earnest effort to establish such a Fisheries Society would encourage the Government to extend to it the same support which it has accorded to the great national Institution across the road—the Science and Art Department—and to that right Royal Institution at Kew, which has aims in the field of agriculture akin to those which we have in the fisheries of the waters.

Whether supported by the State or not, the success of this great Exhibition augurs well for the future of a great National Society established to carry on the work which, begun at Norwich, through the exertions of our far-seeing and energetic chairman, has under the same able guidance, with the distinguished patronage of Her Majesty the Queen, and with the personal co-operation of H.R.H. the Prince of Wales, and other members of the Royal Family, been carried to so auspicious a consummation in this building.

Without venturing to suggest any elaborate scheme for the constitution of such a Society, I may in conclusion attempt to enumerate the salient features of its work.

First of all, the Society should be the repository of every kind of information, practical and scientific, relating in any way to fish and fisheries. In the archives of many of the learned societies of the metropolis and of the provinces are hidden away vast stores of useful knowledge concerning the fisheries, which should be brought under one roof, where all persons seeking information could depend on assistance in making themselves acquainted with everything that had already been done before them. Round the coasts, on the banks of every stream, live hundreds of observers, some of them skilled in recording facts bearing on a particular branch of the subject, others only wanting such direction and encouragement as the Society would afford to become earnest and intelligent workers in the practical development of the fishing industry. Fishermen and others should be encouraged by the offer of prizes to record their observations; and, when they have proved themselves capable and efficient workers, by small occasional or regular grants, to work up special subjects. Systematic records of the temperature of air and water, the state of wind and sea, the nature of the bottom, the presence or absence of particular weeds, the movements and abundance or scarcity of fish, the contents of their stomachs, their condition in regard to fatness and the development of spawn, their growth, their enemies, their parasites, their companions, and of many other points, should be made day by day all round the coasts. Men of proved capacity, and enjoying the confidence of their neighbours, should be appointed for particular districts, to direct, encourage, and assist the fishermen both to give and to seek information

concerning fish and aquatic animals and plants, the modes of catching, increasing, preserving them, and transporting them to market, and the various uses to which they can be put, either as food, or in the preparation of drugs, oils, manure, and other products. Finally the Society would be able to arrange for periodical Fishery Exhibitions to be held at various points around our coasts, thus giving the fishermen on the spot the opportunity of learning those valuable practical lessons which, to many of them, are of far more use than learning imparted by books: and thus it would realise the hope expressed by the Royal Commission on Sea Fisheries, and emphasised by Mr. Huxley in his Inaugural Address in this building.

In all these details the functions of the Society would be purely educational. It should stand at the very antipodes of any scheme for fostering the fisheries by any system of bounties, of premiums, of loans, or in any other way than by encouraging research, and directing practical enterprise.

It would educate the fisherman to prosecute his calling in the most thorough and intelligent manner, and with the most suitable appliances; the boat-builder and nautical outfitter to give the fishermen the most roomy, seaworthy and convenient vessels for the purpose; the curer to prepare the fish in the simplest, most economical and most effective manner for the different markets; the legislator to frame wise laws for the regulation and, on good cause shown, for the protection of the fisheries, and, while protecting the fish, not to forget the duty of affording protection to the lives of the brave men who run such risks in their arduous and honourable calling; and last, but not least, it would educate the public generally to insist on proper facilities being given by railways, market

authorities and others, for the distribution of the fish caught at such infinite trouble, to find good qualities in fish which they have been apt to despise as "offal," and, when they have bought it and paid for it, to cook it with some regard for its value, after the enormous labour it has cost to bring it to their doors.

DISCUSSION.

Dr. FRANCIS DAY said the Paper which had just been read would commend itself as showing what was required for the fisheries of this country. There was only one thing he had to remark. It appeared to him that something similar already existed, for he thought the Chairman presided at a meeting held at Fishmongers Hall last year, and several gentlemen now present were at the same meeting, when a society was formed, such as Mr. Fryer now proposed to inaugurate. He should almost have thought that Mr. Fryer was ignorant of that society, but when he looked at the names of the council, he found amongst them Mr. Fryer himself; and, therefore, it appeared to him that both Professor Huxley and Mr. Fryer must have taken their views from the prospectus of the National Fish Culture Association, which he held in his hand. It was true that Mr. Fryer proposed to alter the name of the Association into the National Fishery Society, a proposal which he had himself made on the day the society was inaugurated, with the exception that he suggested National Fisheries Institution. Passing on to the question of sea fisheries, it was evident that Mr. Fryer held the opinion that those who thought the sea fisheries were being overworked were raising a false alarm, that in fact the

only persons to be listened to were the Royal Commissioners, who had proposed to do away with all limits and regulations. Still he felt sure he would allow him and others who had been working at fisheries for years to hold their own opinions. Having heard what fishermen had to say all round the coast, he thought, with very few exceptions, they ran perfectly contrary to those enunciated by Mr. Fryer. He would like to ask one or two questions. In the first place he had informed them that the question of the herring fishery was quite worked out, and everything with regard to it was known. Now, one of the most important questions was this, they must all admit that the herrings on the east coast of Scotland were going farther out to sea, and were depositing their spawn in 40 or 50 fathoms or more of water, and he did not know whether the Fishery Department had instituted any experiments to ascertain the effect of this, but if they had, he should like to know first, if the spawn of the herrings sank to such a depth in the sea whether it would hatch or not; and secondly, supposing it did hatch, what would be the result of the superincumbent weight of water on the young herrings: would they rise to the surface or remain at the bottom? Again, supposing the young fry were hatched and came to the surface, would they be as safe out at sea as if they were hatched nearer in shore? With regard to killing the vermin, such as dog-fish, and so on, if everything were going on in such a satisfactory manner, and the balance of nature remained, why was there so much necessity for killing the vermin? surely they were only part of the fisheries. Then there was a little practical remark which to him was quite new. They were told that star-fishes were not sufficiently killed by the fishermen, and the proposition was that each vessel should have a bucket of hot water for

the purpose of killing them. Now, he had been on fishing-boats a good deal, and he thought the fishermen would say that a far easier plan would be to put the heel of his boot on the top of the fish and crush it; as to carrying buckets of hot water about in trawlers to kill starfish it was not a plan which, in his opinion, the fisherman would be likely to take to. Then, again, strong remarks were made about what fishermen said about the spawn; but the word spawn has a little altered its meaning of late years. In old works it appeared over and over again, and he thought, even in papers read there, it was evident that spawn in fishermen's language meant either the ova or young of fish: so that fishermen had not changed their views upon this point. On turning to the late Mr. Buckland's and other reports, it would always be found that the word spawn meant the young of the fish as well as the eggs. Coming back to the question of the society which was proposed, and which he believed all would wish to see, viz. a fishery society for the purpose of collecting information respecting fish and fisheries, he understood that Mr. Fryer intended that it should tell the fishermen what to do and what to leave undone, but it was to be careful not to propose to foster the fisheries. He was not exactly sure what was meant by not fostering the fisheries. Did he mean they were to have nothing to do with artificial propagation of food-fishes, or did he mean pecuniary assistance? If he meant that nothing was to be done with reference to the raising of the young of food-fishes, he could not help thinking that he was taking a very erroneous view. One of the most important questions for consideration at the present time was whether or not it was advisable to hatch marine fishes artificially, and in that way to stock the inshore waters. He imagined that questions of fisheries

and statistics, and information of what fishermen should do, would naturally fall to the lot of the Fisheries Commission, and that the returns received from the Fisheries Board would contain accurate information, such as was received from the Commissioners of the United States, Canada, and other countries, and he must confess he was rather surprised to hear the statement made that these annual returns were only approximate, and of a very imperfect character.

Mr. O. T. OLSEN (Grimsby) said that when the late Mr. Buckland was alive he worked in conjunction with him to some extent, and they sent out a log-book for the purpose of gathering information from fishermen themselves. Since the death of Mr. Buckland he had continued sending out these log-books, some of which were in the exhibition. It was of the greatest importance to get information from practical men. It appeared to him by the establishment of such a society they would get theoretical knowledge only of fisheries, but by the assistance of fishermen themselves they would get practical information, such as he had received personally, but which now may appear theoretical. To establish a society for the purpose of carrying out these investigations would, he feared, entail a great deal of expense. He had proposed it more than once, but he saw the difficulty inasmuch as it would be only the members of the society who would have to bear the expense of collecting and distributing information for the welfare of the whole nation. About twelve months ago, Mr. Chambers informed him that a society was to be formed, which afterwards was named the National Fish Culture Association. That name he did not altogether approve of, but considering the objects of the Association as set forth in the prospectus he thought it did not matter much about the name. Would it not be possible to alter

that name in some way, if considered necessary, and make this the National Fish Culture Association, a groundwork or the foundation of a National Fisheries society as was now proposed? He belonged to a society in Norway for the promotion of Norwegian fisheries, and he thought such a society would work here very well if the means were forthcoming. That was the great difficulty in Norway. They had sent over several men to this country to collect information, and it was found to bear very heavily on their funds. He had also been thinking of a plan by which the fishermen themselves could carry out the object. Supposing this society were to establish a fund, and make loans to the masters of fishing-vessels to enable them to become shareholders or like a co-operative society. The master himself would work the vessel, he would have some pecuniary interest in it, say only a sixteenth part. Suppose a vessel cost £1,600, which was the cost of a good-sized trawler fully equipped; if £100 were advanced to the master he would have a sixteenth share, in addition to his usual earnings, the dividend should not be drawn but to go towards paying off the £100. As soon as that was done another £100 might be advanced him, and so he would go on increasing his capital or shares in the vessel until he became the sole owner. This would cement fishermen to their trade. It would make them more industrious, because they would then have an interest in their own vessel to work for. They would look after the fisheries, and they might be made their own policemen. These master-fishermen would bring information even from the bottom of the sea, Papers could be read locally which afterwards might be printed and circulated. In connection with the same scheme an insurance fund should be started both for the vessels and for the lives of the fishermen, which would

have a tendency to stop or reduce the continual subscription lists which were now going round. In this way they would also be establishing an agency, which would maintain the supply of the metropolis and other large towns with fish, without the necessity of so many intermediate hands which made the fish dearer. With regard to small fish and in-shore fish he believed fishermen would be glad to be their own police in this respect, to prevent the wilful destruction of small fry; they would regulate the mesh, and adopt such regulations as were necessary. They did not want to catch small soles or plaice, but if one did it the others thought there was no reason why they should not. He hoped the society would be formed in connection with the National Fish Culture Association, but it should be national, not international.

Mr. OLDHAM CHAMBERS had listened with great pleasure and attention to the Paper, having taken a considerable amount of interest in fishing and fisheries for some years past. He certainly could not forget the large and distinguished meeting held in Fishmongers' Hall at the end of last year, under the auspices of the Fishmongers Company. There a society was inaugurated, called the National Fish Culture Association, under the presidency of the Marquis of Exeter. No doubt Mr. Fryer would enter a disclaimer to any wish to interfere with the objects of this Association, of the Council of which he was a member; but, on turning to the objects of that Association, he found they were very similar to what was now proposed. They included "to encourage and develop the sea and inland fisheries of the United Kingdom, and thereby increase the food supply of the country by collecting, arranging, tabulating, and publishing in periodical reports information for this and other countries on fish culture and

fisheries, by promoting the formation of libraries, aquaria, and schools for studying the science of ichthyology and fish-culture, and by the formation of a library and museum, and by holding meetings for the discussion of subjects connected with fish, fisheries, and fishermen." Again, "by encouraging and rewarding fishermen and others, to assist in carrying out investigations and observations on the temperatures of the sea, spawning-grounds, food, habits, migrations, and enemies of all marine fish; by collecting and tabulating information on the effects and various modes of fish capture in lakes, rivers, estuaries and seas, and by suggesting remedies for those modes which have proved to be injurious." Those objects, he must say, were identical with the objects of the society proposed by Mr. Fryer, and it appeared to him he had not treated the association with the courtesy which might be expected. If he thought the walls of the association were not sufficiently large, he was quite sure the council would have listened to any proposition he might have made for an enlargement of its objects and the increase of the benefit they hoped to confer on the fisheries. Mr. Fryer had alluded to the great increase of the herrings caught on the coast of Scotland, and there was no doubt in that he was perfectly correct, but it appeared to him they ought to have statistics, not simply of the number of fish brought into harbour, but also of the increase of those vessels on the fishing-grounds, and the improved methods of catching fish now practised, together with the new system of transport. All these things tended to greatly increase the number caught as shown in the statistics. Again, Mr. Fryer alluded to the trawl fisheries. He could only say that many times he had seen the trawl net brought into the vessel containing a fearful number not only of spawn of food fishes, but of immature fish.

Surely the exhibition had done a great work in offering a prize for the best net for the prevention of this great disaster. Undoubtedly among the large number of the pleuronectidæ family there were a great many *solea minuta*, but at the same time there were a vast number of common soles both in the embryo and immature state, and something ought to be done to put a stop to this destruction. He hoped Mr. Fryer would pardon him the remarks he had made, but he was sorry he had proposed this new association, and would have much rather he had brought forward some scheme whereby the National Fish Culture Association would have been enlarged and improved.

Mr. MARSTON said it was unnecessary for him to add anything with regard to the position of the National Fish Culture Association, but with regard to trawling he should like to ask a question or two. There were two sides to this question, they often heard that trawlers did no harm whatever, but if such was the case the question often occurred to him why was it that year after year the fishermen had to go farther away to catch the fish. It was quite possible there were a quantity of fish in the ocean which could not be exhausted, but it was also possible they might be beyond the reach of the markets, and if so it was practically useless. He should like to ask also with regard to the proposed society whether Mr. Fryer had not the idea in his mind that the National Fish Culture Association might be increased in some way to cover the field he desired.

Mr. WILMOT said the subject of a National Fishery Society was a very important one, and one which should have been taken up by this country many years ago. Had that been done there would not have been the present outcry about the want of fish, for it would have brought such force to bear on the Legislature as to cause it to

undertake the protection of fisheries more liberally than it had done. The remarks which had fallen from Mr. Fryer in many points were exceedingly good, but coming as he did from a far off country, where the protection and production of fish was advocated very largely, he regretted that the Paper had not touched on that subject. He did not recollect a syllable was mentioned with regard to protection or production of fish, but that was one of the most prominent features in connection with the requirements of the fisheries. In Canada there was a Minister of Marine and Fisheries whose duty it was to look after this important work. Previous to the confederation of the Provinces each Province had some sort of law for the protection of the fisheries, but they were so abortive as to prove useless. At the time of the Confederation, however, when the seven Provinces were brought together, it was deemed so important that the fisheries should receive protection that a Cabinet was formed for the purpose, which had been of vast service in bringing about many things which otherwise would not have been accomplished. Statistics were obtained from the fishermen, the fishery officers, and various other sources, which were collected and submitted to Parliament annually, and Parliament legislated on any improvement which might be required for the purpose of advancing the general interests of the fisheries or the fishermen. It seemed to him extraordinary that in a vast and intelligent country like Great Britain the Government had not taken up this great question of protecting, improving, and advancing the interests of the fisheries, a step which had been taken by Canada, the United States, and many other countries. It seemed to him a mistake to leave such an important matter to individuals. No doubt great benefits would result from this exhibition and the Papers and discussions connected with it,

and he hoped the question would be brought before Parliament, for he had heard the Chairman himself say it was the duty of Parliament to take it up. Notwithstanding everything that had been said, he contended that the fisheries were decreasing. Even though a million barrels of herrings might be collected to-day, and at the beginning of the century only a quarter that number were taken, it would not follow there were any more fish. It was the reverse; because the fishermen had to go further to get them and to employ ten times the amount of wealth and ability, and a hundred times the appliances which were formerly applied. He contended that until some means were instituted by which fish could come nearer to the coast to carry out the laws of nature in reproducing their species they would be gradually exterminated. He knew of no kind of fish which did not come nearer the coast when laying eggs than at any other times. They were out in the far depths of the ocean feeding, but when spawning-time came they approached the shore and protected places; and if man by his greed was determined to kill these poor creatures, the authority of Parliament ought to step in and prevent it. If such a course were not pursued, before half a century the larger proportion of fish which now frequented the coast would be destroyed, and none would be found at all. In Canada there were large expanses of water, 200 to 300 miles in length, in which the fish had been nearly exterminated. He thought the idea of a National Society was a good one, but they should go farther, and apply to the Government of the country to establish some department which should encourage the fishing industry by protection and propagation.

Professor BROWN GOODE had great pleasure in proposing a vote of thanks to Mr. Fryer, who was to be congratulated for more reasons than one upon his Paper.

It was a well-known principle that views on important subjects which evoked no opposition were of very little value; and, in addition to many important ideas which had been suggested by Mr. Fryer—some of which he endorsed, and on some of which he might have had something to say if there had been time—the discussion which had been elicited was also of importance. In fact, the great object of these gatherings was to cause such discussions, and to get the people of the country thoroughly alive to the meaning of all these vital questions connected with fishery economy. The objects which Mr. Fryer had proposed were all exceedingly praiseworthy, though he agreed with Mr. Wilmot that he ought also to have referred to an object which was of equal importance—that of fish-culture. At the same time the collection and diffusion of knowledge, and the proper utilisation of the fish supply were all exceedingly important. Whether this could be safely left to a Society or not was a question for each Government to determine for itself. The people of the United States would not feel safe in committing an interest of such great importance, which related not only to the interests of fishermen but to those of everyone in the country, to the care of the few individuals who might or might not take an interest in it. Twelve years ago, the carrying out of these important objects was in the United States committed to an executive official who was of equal importance with the Minister of Agriculture. He did not propose to enter into those questions which had been touched upon by the gentleman who had preceded him, though the one referred to by Dr. Day was exceedingly important, namely, the question whether the eggs of those herrings which spawned far out at sea were hatched, and whether the young fish would thrive as well as those hatched nearer shore. Now,

in that connection he must state that on the American coast they had a fish closely related to what was called hake in England. In the deep sea explorations carried on by the Fish Commission, this fish, which was during its adult life a surface species, found about the shores, was found spawning at a depth of 100 fathoms, and not only did the eggs appear to hatch perfectly well, but the young fish were found in myriads at that depth and throve well, although the adult was not in any sense a deep-sea fish.

Mr. MONDEHARE had great pleasure in seconding the vote of thanks, and congratulated Mr. Fryer on the sound practical idea he had submitted to the meeting. Whether there had been such a society started beforehand or not, he had to be thanked for bringing it forward thus publicly. He considered the proposal made by Mr. Fryer was really an international one. The Society already started was English in its management and constitution. The larger Society would be an international society, because the information to be obtained and the measures proposed or adopted would be known in foreign countries, and would be news to fishermen all over the world. There were other works of this international character, one in particular, which had been much talked about lately, which was French in its origin, and yet was really an international work, and this would be the same. It therefore gave him the greatest pleasure as one of the foreign delegates to approve of it.

The CHAIRMAN in putting the resolution said allusion had been made to the National Fish Culture Association, and he was sure nobody was a more hearty supporter of that association than himself, as would be believed when he informed the meeting that he was on the Executive Committee. Certainly, if he had any doubt in his own mind

in regard to Mr. Fryer's proposal interfering in any way with the Association, he should not have presided at this Conference, but as far as he understood from Mr. Fryer, and certainly from the paper he had just heard, he gathered that what Mr. Fryer desired was more that there should be some central department to which those who were interested in and connected with the fisheries of the United Kingdom should be able to communicate, and which did not now exist in any way. In his experience, especially during the last four or five years, whenever he had to make any communication with the Government with respect to fisheries, there was always a doubt to what department to go to—whether to the Home Office to ask a question of the Inspector of Salmon Fisheries, or to the Board of Trade to ask Mr. Cecil Trevor relative to depredations by foreign or English vessels, or a question on oysters, or in connection with the foreshore, or to Mr. Gray, if it were concerning grievances respecting the lights for fishing vessels, and other matters. There was no central authority whatever to go to. Now, if he wanted any information with regard to the United States, he should at once communicate with his friend, Professor Brown Goode, or Professor Spencer Baird; if with regard to Canada, he should go to Mr. Wilmot; if connected with German fisheries, he should go to the Deutscher Fischerei Verein; but here in England there was no central authority to go to, and that, he understood, was the main object of Mr. Fryer's proposal. In numerous cases he had found that the Government of the day—it did not signify what Government it was—seemed to legislate first and then to hear the fishermen's complaints with regard to legislation which had been passed. He had found it so to his own cost, for one of the most important questions which had been under discussion for several years

was the matter of fishing-vessels' lights in an international point of view. All the maritime countries of the world looked to England to devise the best system of fishing-vessels' lights, and yet it was actually the fact that the system of lights arranged in England was proved by the Select Committee, which he persuaded the House of Commons to grant, to be one which could not possibly be carried out. That was proved beyond doubt, for the Government witnesses that came before the Select Committee had to acknowledge that they had had no experience whatever with regard to fishing-vessels, and had never been in a fishing-vessel at night. He himself cross-examined them at considerable length, and in four cases he remembered the Government witnesses acknowledged that they knew actually nothing about fishing-vessels. That was the way in which legislation was carried on, and he did think it was of paramount importance that there should be some government department, or some association, whose objects were far wider and greater than those of the National Fish Culture Association, which he was proud to belong to. He was convinced that all the Foreign Commissioners would confirm what he had said, that in a great maritime country like England, whose fisheries were of such importance, this want ought to be supplied.

(The vote of thanks having been carried unanimously),

Mr. FRYER, in responding, said he had not only to thank the meeting for the kind way in which the motion had been proposed and received, but also to thank those gentlemen who had been so good as to criticise his paper. He had purposely introduced many debatable points, because he felt that, if he made a proposal for a Society to deal with a subject on which everybody was agreed it would fall flat. It would be perfectly unnecessary to have a Society or or-

ganisation to deal with a subject on which everybody was agreed; but there was no question under the sun which seemed to him to have more sides than the fishery question. If he might venture on a somewhat trite illustration, this was shown by the fish themselves; there were flat-fish which had a top side, and a bottom side; there were the so-called round-fish which had a right side, and a left side: then there were fish which were globular, or almost so, and were either all sides or no sides at all; and all the questions connected with fisheries were as many-sided as the different fish themselves. In suggesting the formation of this Society, he did not at all lose sight of the fact that the National Fish Culture Association was already in existence, for he had the honour of being a member of the council; but if he had suggested that society, as the foundation upon which to build up the very much larger body which he had proposed, he would have been taking an invidious course, as there were others which could make an equally good claim on the score of age, at any rate. Several societies already existed dealing with fisheries from one point of view or another—such as the Fisheries Preservation Society, a body which had existed for some time; the Scottish Fisheries Improvement Association; the Rivers Purification Association, and others of a similar kind, besides the youngest and very hopeful one to which reference had been made, but whose title, he thought, limited its work. He should himself certainly hesitate to belong to a society which proposed to take up the question of the culture and breeding of fish by artificial means if it did not intend, first of all, to fortify itself with information as to the habits of those fish; and, as for the other points mentioned in the prospectus of the association and quoted by Mr. Chambers and Dr. Day, he thought they

were essential to its existence as a practical body formed specially for the promotion of Fish Culture. If, however, it was found that the constitution of this Society could be made the basis on which a larger Society with a wider scope—partaking more of the nature of the Deutscher Fischerei Verein, which had done such good work in Germany—could be established, he should be only too glad to see if he could do what Mr. Marston had suggested and assist in extending its scope. He had the very opposite of any intention to ignore or to conflict with that Society, and he thought that, if his much larger scheme were carried into effect, the Fish Culture Association would find in it, not a rival, but an ally, from which it might derive assistance in the particular work which it was taking up. Several points, which had been referred to by Dr. Day and others, he had omitted, fearing that the Paper would run to too great a length. As to the question of fish-breeding, which Mr. Wilmot suggested he had omitted, he might state that one of his first paragraphs, and almost the last, referred to the "desirability or otherwise of taking direct measures for their multiplication." Possibly that was a roundabout way of saying that artificial fish-culture should be one of the objects of the Society, but that was certainly the meaning of it; and later on he also suggested that "modes of increasing fish" should amongst other things engage the attention of the Society. As to the points which Dr. Day had referred to, he was perfectly aware of the interesting fact of herrings being caught farther away from the coast; and it was because they had no means of explaining it—and he did not think Dr. Day himself would venture to explain, fully, the whole of the reasons which led to herrings being caught further away from the shore,—that he proposed the Society should take up the

study. As to this fact having any influence on their numbers, he thought that was answered to a certain extent, perhaps not altogether, by the statistics of the Scotch herring fisheries. Where the numbers of herrings caught had increased from 130,000 barrels to over a million, it seemed evident that, though the herrings went farther away, they were not diminishing in numbers, and Professor Brown Goode had suggested another reason for believing that they were not injured by spawning in deep water. On the question of the use of the word "spawn" or "fry," he thought if fishermen used the word spawn and meant fry, it was quite time the distinction was thoroughly understood. The words were used together, both spawn and fry, in ancient Acts of Parliament—"spawn" referring to eggs and "fry" to young fish. He saw that Dr. Day shook his head, but he thought he could put his finger on an Act of Parliament, of the reign of Elizabeth,* where the words were used in the same sentence. On the question which Mr. Wilmot referred to, of small soles being caught in enormous numbers as a proof that the adult soles were diminishing, and of soles and other fish coming close to the shore to spawn, he thought that was a point which required very careful investigation. If soles and all other fish came in to spawn he did not understand how it was that the trawlers near the coast in Torbay and other large arms of the sea did not catch the large fish at the same time as they caught the small. If the large fish came in to spawn they must be there to be caught; but the evidence of the Torbay fishermen was to the contrary. When they

* I have since looked up this Act. It is one of Eliz. cap. xvii. "An Act for Preservation of Spawn *and* Fry of Fish." There are several other Acts, both earlier and later, which support my view.—C. E. F.

came inshore from stress of weather they caught only much smaller fish than they did farther out. That seemed an indication, at all events, that the soles did not come inshore to spawn, but spawned as herrings did, and he hoped with as little ill effect from it, in the deep sea. But all these points were strong arguments in favour of the institution of the society he had advocated. Before sitting down he begged to propose a vote of thanks to Mr. Birkbeck for his kindness in coming to preside on the occasion, which he felt to be a very great honour considering the great calls upon his time, not only in connection with the Exhibition but also with the House of Commons.

Mr. WILMOT seconded the motion with much pleasure, because he understood that Mr. Birkbeck stood foremost in this country with respect to the interest he took in the great fishing industries. He was the inaugurator of the first fishery exhibition, and was Chairman of the Executive of this one which is the International adjunct to that held at Norwich. He had been a member of Parliament for some time and no doubt would remain so for a long time yet to come, and he hoped that before long he would hold an official position at the head of a Government Department which would preside over the interests of British Fisheries, for there was certainly no one more competent to occupy so important a post.

(The resolution having been carried unanimously),

The CHAIRMAN, in responding, said it had given him great pleasure to attend, and he could only regret that his time had been so fully occupied whilst the Conferences had been going on, that he had often found it impossible to be present on several occasions when it would have given him great pleasure to have taken part in the proceedings.

ADDENDUM.

SINCE the reading of the foregoing Paper I have thought it desirable to take this opportunity of removing one or two misconceptions which appear to have arisen as to the scope of the Society whose formation I have ventured to advocate, and especially on the point whether such a Society would necessarily interfere with the work and interests of the "National Fish Culture Association," or of any other body already formed to take up any particular branch of the great question of the Fisheries.

The observation of Dr. Day—which (so far as it relates to Mr. Huxley), did not reach my ears during the discussion—that "both Professor Huxley and Mr. Fryer must have taken their views from the Prospectus of the National Fish Culture Association," is sufficiently disposed of, so far as Mr. Huxley is concerned, by the fact that, (as mentioned by Mr. Huxley in his Inaugural Address which I quoted, and with which Dr. Day was presumably acquainted, either as a hearer or as a reader,) the idea of "an influential Society specially devoted to the British Fisheries," was suggested so long ago as 1866, in the Report of the Royal Commission on Sea Fisheries, of which Mr. Huxley was a member. So far as I am personally concerned, Dr. Day's assumption rests on no stronger foundation. I can only repeat that I was ignorant of the existence of the paragraph in the Report alluded to until I heard it quoted in Mr. Huxley's address; and that the proposal to form a National Fisheries Society had been suggested by me to the Commissioner for Conferences before the opening of the conferences. That I did not derive my inspiration from the prospectus of the National Fish Culture Association will be understood when I say I have always regarded that Association as having been formed for the sole purpose of encouraging "fish culture"—as the statement of its "objects" sets forth—"by founding, promoting or acquiring establishments for fish culture and by aiding or undertaking such experiments as shall seem advisable: by using its best endeavours, with the consent of the authorities, to encourage and assist in the stocking of public and all other available waters which are placed under suitable

regulations, with fish, for the recreation and benefit of the community."

That I am not singular in the notion that the National Fish Culture Association was formed with the exclusive object indicated by its title, is shown by the following records.

In the *Field* of October 7th, 1882, appeared a letter from Mr. R. B. Marston, who wrote as follows: "A month or two ago, Mr. Francis Francis suggested to me that I should get up a National Fish Cultural Association. ..... Mr. Chambers and I have taken the matter in hand, and we shall shortly send out a circular calling a meeting of pisciculturists, and explaining the proposed association, the *sole* object of which will be the improvement and extension of *pisciculture* in all its branches."

This was followed by a letter in the *Field* of October 14, wherein Col. Stuart Wortley asked, "If Mr. Marston is able to carry out his proposed Fish Culture Association, may I suggest one of the principal points for inquiry and improvement should be the transport of sea fish for *turning down alive?*"

To this Mr. Oldham Chambers replied in the *Field* of October 21, by saying that "The subject not only of the transport of our deep-sea food-fishes, but also of their artificial propagation, has received my attention; and I certainly should not deem the Association complete without it embraced this branch of the science."

In December 1882, a circular signed by Messrs. W. Oldham Chambers and R. B. Marston—a copy of which appeared in the *Field* of December 16—was issued to gentlemen "interested in the subject of fish culture," stating that a meting would be held at Fishmongers' Hall on December 20th, with the "object" of forming a "National Fish Culture Association of Great Britain and Ireland." This circular proceeds:—"We feel sure you will agree with us that such a society is wanted, and has an immense field open for it. At present all British effort in fish-culture is individual effort, and not only do the public generally know little of what is being done, but our fish-culturists themselves are often quite ignorant of what other labourers in the same field are doing; as proof of this, we may mention the difficulty we have experienced in getting the names and addresses of fish-culturists, and we are aware that there are many whose names we have failed to obtain.

"We know from experience that in this country an increasing interest is being taken in fish-culture and fish-

farming of all kinds: in other countries, including our own colonies, fish-cultural societies are doing most valuable work. . . . It will, of course, be in no sense a commercial undertaking, but purely a scientific society, established on the simplest and broadest foundations, viz., to promote the interests of inland and sea fish-culture of all kinds in the best way possible."

At the meeting held in accordance with this notice, the following resolution was, among others, as reported in the *Field* of Dec. 23, "put and carried unanimously":—

"That in the opinion of this meeting it is desirable that a National Fish Culture Association of Great Britain and Ireland should be established for the purpose of improving and extending the cultivation of our fresh and salt water fishes in the best possible manner."

The other resolutions merely nominated a President, Vice-Presidents, and a Council, consisting mainly of gentlemen "interested in Fish Culture." Not a word was said by any speaker of any other object being in view than the promotion of "fish culture," "pisciculture," "breeding fish," "transplanting the ova," "importation and distribution of ova," "re-stocking," and "operations in ova."

So far as the other "objects" of the Society, as quoted by Dr. Day, and Mr. Oldham Chambers, are concerned, they are merely the incidental and subsidiary means by which the one main object of the Association is to be achieved; and, although they are essential to the proper performance of the functions which the Association has assumed, they are naturally relegated to the end of the Prospectus, of which "Fish Culture" stands in the fore-front. As I have already said, I should be sorry to belong to a Fish Cultural Society which did not make itself acquainted with the habits of the fish it proposed to breed, and which did not fortify itself, by inquiry into the condition of the fisheries, and their possible depletion or diminution, with information as to the possibility and necessity of artificial fish-culture as a means of remedying such diminution.

But, after all, the important question is, whether the "National Fisheries Society," which I have proposed, taking up *every* question connected with the fishing industry, would necessarily clash with the interests of existing societies dealing with *single* branches of the subject. It is urged that the proposal I have made is for a society which would be only the National Fish Culture Association under another name. It might as fairly be urged that it would be only a duplicate of the Rivers Purification

Association, or of the Meteorological Society, or of the Scottish Fisheries Improvement Association, or of the Fisheries Preservation Association, or of the Institute of Civil Engineers, or even of the Linnæan Society and other learned bodies; for, in dealing exhaustively with every question relating to fish and fisheries, it would necessarily find some portion of the ground which it proposed to occupy already partially covered in different ways by each and all of these bodies. But there is a large area of vacant ground, not yet taken up, which ought to be thoroughly surveyed, in order that the complex questions affecting the fisheries should be thoroughly worked out from every point of view. A central institution is therefore needed which should not only occupy every inch of ground hitherto unoccupied, but assist in developing what is but imperfectly tilled, and also direct and aid, and at the same time derive assistance from, the operations of societies already diligently working in their own special field. At the present moment there is no such central body in existence, and I doubt if there is any society so organised that it could be expanded to do the work which lies waiting to be taken up.

If it be seriously maintained that there is no room for such an institution as I have proposed, because the National Fish Culture Association already exists, I fail to see how there can be room for a second body specially formed to take up the particular work which the Fish Culture Association has cut out for itself; and I own, therefore, to a feeling of surprise when I find from Mr. Marston's Paper on "Coarse Fish Culture,"* read on June 29, 1883, that he has himself assisted in the creation of such a body,†—the "United London Anglers' Fisheries Society,"—to take up the very work that the Fish Culture Association was formed to carry out, and that he couples the two societies together‡ in a recommendation that they should devote their energies to the "hatching and rearing" of "fry of all kinds of coarse fish for distribution to angling clubs and private individuals requiring these fish."§

* "International Fisheries Conference Paper on 'Coarse Fish Culture,' by R. B. Marston, editor of the *Fishing Gazette*, and member of the Executive Committee of the National Fish Culture Association."—Published by William Clowes & Sons, Limited, for the International Fisheries Exhibition.

† *Ibid.*, pp. 7 and 10.

‡ *Ibid.*, p. 13.

§ *Ibid.*, p. 11.

I submit, however, that, whether there be many or whether there be few of such associations, the desirability of a great central institution, to take up the whole of the vast range of fishery subjects, is self-evident. Far from finding themselves in conflict with it, the various societies formed to take up any particular branch or branches of the question would see their labours supplemented by, and could in their turn supplement, those of the central body. As the National Fish Culture Association, by affiliating itself, or working in harmony, with the central institution, could continue, under its auspices, its particular work of artificial breeding, so the Rivers Purification Association could be helped to work out the question of remedying the pollution of rivers: the help of the Meteorological Society could be engaged in the study of meteorology in connection with the fisheries and the question of storm-warnings: the coöperation of the Engineers could be secured in working out the problems of fish-ladders and the supply of water to mills and passes: and so on through the list. And as with Societies so with individuals: the labours of particular observers on any subject connected with Fish and Fisheries would be recognised and encouraged, and directed into useful channels. All the interests affecting or affected by the fisheries would be represented in the Central Society; of this central body existing societies taking up special subjects could form branches or committees, as it were; while other branches or committees would be appointed to deal with the many separate objects not hitherto represented in any form.

C. E. FRYER.

August 2nd, 1883.

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